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ON THE PROPOSED UNIVERSITY OF THE UNITED STATES AND ITS POSSIBLE RELATIONS TO THE SCIENTIFIC BUREAUS OF THE GOVERNMENT.

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FOR some years the proposition has been discussed that a National University should be established in Washington to represent that projected by Washington himself, and for which he provided, as he supposed, in his will. The foundation, for various reasons, did not materialize, and though one of the reservations in the original plat of the capital city was designated by Washington as a site for the proposed university, no funds being forthcoming, the scheme until lately has remained dormant.

Recently, owing to the interest and enthusiasm of a number of friends of education, the scheme has been revived and much popular interest expressed; several bills have been laid before Congress, and steps taken toward securing popular subscriptions, and the use of a site in the District of Columbia, on one of the public reservations for projected buildings, to be used in connection with the work of the university.¹

¹ The originally designated plat was afterwards used for the Naval Observatory, and has recently been abandoned, partly on account of the prevalence of malaria.

As far as university instruction of the ordinary American type is concerned, the District of Columbia is already well supplied with the means of furnishing it. It is only necessary to refer to the names of the Georgetown University, the Catholic University, the Columbian University, Howard University, the National University, the proposed American University, and their associated special schools, to make this plain. While nearly all these institutions are more or less distinctly under the control of some religious denomination, I believe none of them confine their educational efforts to students of any one particular faith, and in most of them instruction is sufficiently free from sectarian bias to render the denominational control a matter of little importance to their students, except in so far as it tends to preserve a good standard of morals.

It is, I believe, admitted by the friends of the projected institution that there is no sufficient reason for establishing a new competitor for the opportunity of giving undergraduate instruction. Few friends of liberal education would advise that to the workers in a field already so well occupied, and most of whom are so poorly endowed, should be added another institution of similar character and aims. Generous givers might far better contribute to the strengthening of those already established. But it is claimed, and with some show of reason, that there is still room for an institution of a different character, in which those who have already acquired the essentials of a liberal education could pursue special branches of study, utilizing the opportunities which might be afforded by the government laboratories in various departments of science, to make of themselves highly skilled specialists, for whom the growth of the country is beginning to open a career.

Assuming, for the purposes of argument, that this contention is just, the present paper is intended to discuss, from the point of view of the official man of science, the practical questions of what relations between such an institution and the executive departments of the government are practicable and advisable; and also the organization best suited to promote harmonious and successful coöperation between the departmental laboratories and the members of such a university.

It must be said that the projectors of the enterprise have so far dealt chiefly in generalities, and have hardly touched upon the practical side of the question, which, nevertheless, is a factor upon which the success or failure of the scheme must very largely depend. In fact, most of the documents relating to the proposed university which I have been able to consult absolutely ignore this side of the matter, and even display an apparent ignorance of the conditions which have to be met. It is in the hope of throwing some light upon them, without partiality for or against the project, and in the hope of eliciting further information by discussion from those especially qualified to give it through their connection with the government laboratories, that this paper has been prepared.

Some thirty-four years' experience in the scientific work of the government has given the writer a tolerably good insight into the methods now or formerly in use and the conditions of this side of the problem. During this time the expansion of the scope of this work has been very great, and with the expansion has necessarily come more or less severity of restriction for the purpose of fixing responsibility, controlling expenditures, and defining the limits of work to be authorized. These restrictions have much increased the labor and difficulty of carrying on the work, and to some extent the expense of it. Every worker has realized this, and most have felt disposed to criticise it. The restrictions are frequently double-edged; made by legislators unfamiliar with the methods of science, and having one object in view, they sometimes, whether accomplishing that object or not, bear very severely on the worker in some other direction not at all originally in contemplation. Nevertheless the government has, on the whole, been generous, and the restrictions for the most part beneficial in that, if rigidly lived up to, they protect the scientific bureaus from ignorant and unjust attacks from those with a morbid appetite for scandal. In the last instance, somebody always has to be trusted, and the narrower the field for the exercise of untrammelled judgment, the less subject to unreasonable criticism is the person upon whom the responsibility is laid. This responsibility is divided between the executive head of a bureau and his subordinates

in various measure, but the chief part of it is shared by the Director and the "heads of divisions" who have the direct superintendence of the details of the work. The former, subject to the approval of the Secretary (which in most cases is given as a matter of course), decides the policy of the bureau in its special functions, the allotment of money and work to the different divisions, and the general character and quality of work which shall represent the bureau. He is also the general intermediary between the Department and Congressional committees concerned with the special work of the bureau, explaining the necessity for particular expenditures for which authority is asked, or the propriety of any action about which question has arisen.

The "head of a division" has generally the immediate control of work decided upon and of the special workers, supervises methods and estimates cost, is responsible for accuracy and economy in the use of the fund allotted to the work of his division, and the attendance and efficiency of those engaged in it. Upon him the Director relies for most details, and to him the individual workers look for their instructions.

Both the directors and the "heads of divisions" are usually overworked, and the latter are almost invariably underpaid. The necrology of the scientific staff from year to year shows a lamentable number of early deaths from causes directly or indirectly connected with overwork, "burning the candle at both ends." The temptation of the opportunity for research offered by government laboratories, and unequaled elsewhere, is responsible for the presence in them of many men who in private life would be enjoying the frugal living, high thinking, and long summer vacations of colleges, or from five to ten times their present salaries as consulting experts. Another feature of life in the laboratories is exemplified by the presence there of men who, by years of labor in their specialty, are known around the world as experts of the highest rank, whose contributions to science in a single year far outweigh the best college thesis for the doctorate of philosophy or science, and yet to whom the grant, by some appreciative Faculty, of this modest badge of honor would rouse from the mass of educators a storm

of protest. Such instances could be mentioned, and show conclusively how little general knowledge exists among educated men, not scientists, of the kind and quality of work turned out by the scientific bureaus. This brief statement of conditions is necessary for the clear understanding of the points which are to follow. Addressed to an audience of officials it would be unnecessary.

It is the writer's opinion that the university should be free from the trammels of government control, and that it should ask from Congress only its charter and the privileges of the laboratories; that it should not be a government institution, but should stand on its own merits. Perhaps the grant of a site for the university offices, on one of the larger reservations near the government buildings, might be accepted, as in the case of the Smithsonian; provided it was clearly understood that this did not constitute the university a governmental entity. The objections to its becoming such are many and serious, and will not be enlarged upon here; that it would dry up the springs of private bounty is certain, and is sufficient to condemn the proposition.

On the other hand, the grotesque project of forming its governing board of a dozen active presidents of existing colleges is so preposterous that it only needs to be stated to meet its fate with thinking people.

The university should have for executive purposes a governing board solely its own, and as small as possible, both for efficiency and economy. The faculty should decide on all matters connected with teaching and discipline, and the alumni be granted advisory status on large questions. One or two members of the executive board should be taken from the list of directors of scientific bureaus, but in their private, not their official capacity. A board wholly inexperienced in government routine and conditions would be constantly in hot water.

Various branches of university training stand somewhat outside the laboratory work, though more or less dependent upon the libraries and archives of the city. For these the appointment of professors would be required. There should probably

be a few administrative members of the faculty covering the branches which did avail themselves of the laboratories, but more to act in an advisory capacity to the student than to teach him. The laboratory student while at work should know but one executive head, the chief of division in whose laboratory his work is done. Any division of authority here would be fatal.

We would have then a small executive board, a small faculty, and, as it naturally follows, small administrative expenses. Concentration of power in the hands of competent men is the soul of efficiency and the warranty of success.

No funds should be sunk in pretentious buildings. A single building, with one large acoustically perfect hall, and as many smaller lecture rooms as seemed requisite, with offices for the archives, bursar, and administrative men, would be all that would be really necessary or useful, at all events for some time to come. Under these circumstances the funds contributed could be almost wholly devoted to the true purpose of such a university, the production of highly trained experts, and the endowment of research.

It is obvious that the interests of the government's own work would permit of only a small number of students in any one laboratory, such a number, in each case, as the chief of division felt certain could be advantageously utilized and controlled. It would be impracticable to admit professors or classes into any laboratory except as rare visitors, such as occasionally come now.

The laboratory student must come, if at all, as the regularly employed workers come, to keep the same hours, observe the same rules, and render to the chief the same obedience. For the class of men we are considering as possible students this would not be a grievous requirement. The method of instruction would necessarily be that of Agassiz. Actual work on actual material, with results in sight from the first, and methods absorbed through contact and experience not merely experimental. I think there are few chiefs of division who would not welcome one or two well-trained enthusiastic students under such conditions.

The question then arises as to how the reception of students might be controlled and organized. A simple resolution or bill in Congress, authorizing the scientific bureaus to admit, subject to the approval of the director and chief of division, such students as they may find qualified, and who can be employed with advantage to the work of the bureau, would be all the legislation that is needed; unless Congress should require that their presence should involve the government in no expense or responsibility, and authorize the officers above mentioned to make rules to cover the conditions. As these are different in each laboratory, the rules should be left to the authorities of each laboratory. The function of the university, as such, in the case of these students would then be limited, as in the case of London University, to a determination of their qualifications and the issuing of an equivalent degree, not necessarily by oral examination, but on the record of work accomplished, if it proved desirable. For such men the acquisition of the qualifications should regulate the duration of study, not some arbitrary period of time. The Director of the bureau should be authorized to accept or reject students, because he is responsible for the work of the bureau, and the Chief of division because upon him falls the responsibility for the success and proper conduct of his own divisional work, and whatever labor and time is required to direct and utilize the student. The position of the Chief of division with relation to the student and the university will then be that of a tutor or docent, and in return for his services to the student the university should provide a modest honorarium which might be refunded to the university by the student, or deducted from the amount of a scholarship if the student held one, or paid by the university as endowment of research. It would be better that no private arrangement between teacher and pupil should be permitted, but that such transactions should be handled by the university authorities, for obvious reasons. If the university were a government institution, it could not pay fees to any government official under the present law, which is not likely to be changed. It would be obviously unjust to add to the regular official duties of a laboratory chief the responsibility involved in the recep-

tion and supervision of pupils, without some remuneration. For the infinitesimal cost which might indirectly fall upon the United States through the presence in the laboratory of one or two students, the government would be amply repaid, both by the gratuitous labor of the student and by the creation of a body of experts already trained to government methods who might be available for sudden emergencies.

There remains to be provided for, the method of selecting from among candidates those who should be admitted to the privileges of the laboratories.

Candidates might be required to present to the proper officer of the university certificates of graduation, proficiency, experience, and moral character, with a statement of the line of work they desired to take up. These having been classified, the directors of the bureaus concerned, on notification, might appoint the chiefs of those divisions for whose privileges application had been made, and who should meet as a board or committee to discuss applications and report their decisions to the various directors. The conclusions of the committee having been ratified by the directors, and referred back to the board, could by it be transmitted to the university authorities, who could then announce to the successful candidates that, on matriculation and payment of university fees, they would be duly accredited to the laboratories concerned.

This method would enable the university annually to allot a small but picked body of the most promising students of the country to those places where they could get unique opportunities for special work; and would, in the course of time, produce a body of experts, many of whom would naturally gravitate into the government service, and all of whom would be available for special services to the government, if needed, in a way no other method of training could supply. If the university graduated only twenty such men in a year, it would more than justify its existence. It would thus not compete with any other institution, and would supply a training and experience not to be gained elsewhere.

There are of course, as in all human affairs, opportunities for friction and criticism in the plan proposed. The general

proposition that such a body as the proposed university should be admitted to such privileges is one upon which differences of opinion might naturally exist, and which is not discussed in this paper. Here I have assumed the affirmative reply to the general question, and merely presented for criticism and discussion the outline of a comparatively simple scheme by which the proposed relation between such a university and the government laboratories might be carried into effect. That it is practicable I am convinced from the experience of former days, when the towers of the Smithsonian sheltered a body of mostly impecunious but enthusiastic volunteer students, under the supervision of Henry and Baird, almost every one of whom in later days became distinguished for services rendered to science.

Should the plan suggested fail to recommend itself to the promoters of the new university, it would still be possible for any existing institution of learning, or any number of them in association, to avail themselves of the undoubted opportunities herein pointed out. The formulation of plans to this end would be simple and easy. In this connection I may quote a few paragraphs from an abstract of the current annual report of the Secretary of Agriculture, which has appeared in the daily press since the preceding paper was written.

THE DEPARTMENT AS AN AID TO POST-GRADUATE WORK.¹

Regarding the facilities of the department for post-graduate instruction, the secretary says there is no university in the land where the young farmer may pursue post-graduate studies in all the sciences relating to production, but that the scientific divisions of the Department of Agriculture can to some extent provide post-graduate facilities.

The chiefs of divisions are very proficient in their lines, the apparatus the best obtainable, the libraries the most complete of any in the country, and the studies of a few bright people could be directed in each division, so that when the department requires help, as it often does, the services of these young scientists would be available.

These students should be graduates of agricultural colleges, and should come to the department through an examination that would bring the best young men. The capacity of the department is limited ; but assistants are

¹ *Washington Evening Star*, Dec. 2, 1898.

often tempted to accept higher salaries in state institutions, and the opening of the laboratories to post-graduate work would provide an eligible list to fill vacancies as they occur, supply temporary agents, and be a source from which state institutions might get assistance in scientific lines.

ADDENDUM. — The preceding paper, for the purpose of eliciting discussion and suggestions, was read at a meeting of the Philosophical Society of Washington, Dec. 10, 1898, and some of the points raised may advantageously be noted here.

The discussion took a turn toward the distinct proposition of a governmental university, which was considered by Prof. Lester F. Ward and Surgeon-General Sternberg, but which the present writer regards as impracticable, even if desirable, under present conditions.

The points bearing on the proposition advanced in this paper, and which it seems desirable to notice, are as follows :

1. That the organization proposed would not constitute "a university."

The writer is entirely indifferent as to the title of the proposed institution. What he has tried to show is a practicable means of utilizing certain at present unused opportunities of great value to special students.

2. That the plan would not accommodate all who might apply, and that some bureaus might not be willing to accommodate any students.

This is, of course, the essence of the problem. It would in any event be impracticable and unwise to hamper the bureaus by undesired additions to their corps. But the competition for the opportunities would make them even more desirable to the ambitious student, and secure for them the most promising men. The plan is essentially intended as selective of, and only of, the very best.

3. That while in certain lines there might be opportunities for a fair number of students, the fact that there were other lines in which no students could be accommodated would render the distribution of the men among the different branches of science unequal, or, to use the phrase of one of the critics, the "university would be lopsided."

I have never heard of any university in which the number of

students pursuing special post-graduate courses was equal, or nearly equal, in the different specialties. Tastes are not equally represented in the graduate population any more than opportunities in the world at large. At any rate, no more could be utilized than exist, and if the numbers in different lines are unequal, this is no reason why any of them should be wasted.

Doubts as to the workability of the scheme here proposed were only expressed by one or two persons, none of whom had had practical experience in the laboratory work, and I would repeat that I have entire confidence in its practicability, knowing from my own experience that many students have passed from temporary post-graduate employment in the laboratories to lucrative and successful employment elsewhere.